DATA BRIEFS...

○ **The ten most wanted software packages,** according to a compilation of sales to over 4,000 U.S. and foreign retail outlets, by Softsel (immediately before we went to press): *Business programs:* 1-2-3, The Bank Street Writer, PFS: File, The Home Accountant, VisiCalc, DBase II, PFS: Report, MultiPlan, Sensible Speller, WordStar. *Games:* Zork I, Frogger, Zaxxon, Deadline, Choplifter, Wizardry, Zork II, Temple of Apshai, Flight Simulator, Jump Man.

PUBLICATIONS

○ **How to Buy a Home Computer,** a 50-page illustrated booklet provides step-by-step answers to questions by first-time and second-time buyers. Some of the queries answered: What do I want my computer to do? What software do I want? What other peripherals should I consider? Send stamped (54¢) self-addressed envelope to: *Consumer Electronics Group of the Electronic Industries Association, P.O. Box 19100, Washington, D.C. 20036.*

○ **Microcomputers: A Checklist of Security and Recovery Considerations** is a four-page checklist of personal computer security and maintenance considerations. It includes tips for disk drive care; advice on arranging for use of "loaners" in case of system breakdown; environmental protection; and a special section on documentation. Send $1 to: *Assets Protection Publishing Co., 5201 Middleton Road, Madison, WI 73705.*

○ **Want to complain about computer products or services suppliers?** The non-profit Better Computer Corporation (BCC) will help make your complaint public by publishing a monthly top-10 chart for the worst service, by publicizing it in the major personal computer magazines, and, most important of all, informing the firms in question of their not-up-to-par performance. BCC is also starting to build a data base on manufacturers and retailers who have a history of troubled relations with consumers. BCC requests that

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BARON'S
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Vol. 1 No. 4 OCTOBER 1983

SECOND COMPUTER

When one is not enough...

Second Computer Selection Guidelines

The ongoing spread of the use of microcomputers has generated a new phenomenon: the two-computer home or office. With it has come a new challenge to computer users: how to select the second system and on what basis. Basic selection criteria are presented in this article. They differ in some important respects from those to be considered by a first-time computer buyer — both because of the second-time buyer's greater knowledgeability, and because it is assumed that the first computer will be kept and used by its owner.

Basic Selection Criteria

- ***Uses planned for the new unit.*** If you own a business-oriented CP/M computer, do you now want a multipurpose home unit which you and your family can use to play games or run educational software? Or, conversely, do you have a game machine and now want a system for your office to run a full range of professional applications?
- ***The computer you now own,*** and the money and time already invested in it are the next factor. Timex/Sinclair or VIC-20 owners have small data files and can buy solely on the basis of future needs. Someone with a $1,000 to $5,000 micro, who uses it extensively and has built up a substantial software library, cannot simply write off the time it took to create his data files.
- ***Maximum hardware/software flexibility*** may be your goal. Apple, Atari, or Radio Shack computer owners may also want to add CP/M; CP/M users — MS-DOS. Owners of popular single-board computers, such as Osborne or Kaypro, may look to bus-based systems which can accommodate more new add-ons than can be put in a small box.
- ***Portability*** is a must for the professional user who wants to move programs and data between home and office machines. Ideally, one wants to be able to put one's diskettes in a briefcase at the end of the day and to work on them directly at home in the evening.

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REPAIRS

TALKING REPAIRS

"Let's face it, computer repair is a crapshoot," says John Ryerson, an Atlanta, Georgia, Osborne I owner. "After my 90-day warranty ran out, I didn't take out a service contract for 10 months. I had trouble with one of the drives during this time, so that cost me. I took out the contract because I started worrying about things like overheating after I had a double-density, 80-column screen upgrade."

Ryerson's reaction is typical of many owners of personal computers of various makes.

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Duplicating one's current system is the safest and easiest approach, but other brands may offer acceptable compatibility while meeting other criteria on the buyer's wish list.

Hardware Suggestions

• ***How about IBM?*** Given the number of hardware and software products for the IBM PC, and the ease of data and program transfer which running with the pack promises — one of Big Blue's machines looks mighty tempting. However many second-computer buyers are on a budget, wish to remain compatible with their present system, or have specialized requirements. A broad range of brand choices exists for them.

• ***IBM PC look-alikes*** offer attractive price/performance characteristics for owners of IBM PCs, or anyone seeking to upgrade to 16 bits. Note: most of the look-alikes have not been around long enough to have been evaluated properly, and their IBM compatibility varies considerably. The transportable, well-engineered Compaq comes closest, but a unit with 128K RAM and one drive lists for $2,995 ($3,520 with two drives). The Eagle PC, Columbia, and Corona desktops and transportables, the Seequa Chameleon, and, possibly, the Osborne Executive II also deserve closer looks.

• ***Apple or Radio Shack*** owners who wish to preserve compatibility should consider a newer machine from the same manufacturer, e.g. an Apple IIe ($1,995 list with one drive and monitor, $2,340 with two drives) or a TRS-80 Model IV ($1,999 list for a two-drive unit). Alternatives to the Apple are the Franklin 1000 ($2,043 list for a two-drive, 64K RAM unit) and 1200 ($2,594 list for two drives and 128K RAM), as well as the less well known dual-processor Basis 108 ($2,595 for 128K RAM, two drives, monitor, CP/M 3.0 and software package).

Radio Shack owners may consider the Max-80 from Lobo Drives International, widely applauded for its hardware, operating system flexibility; and its low price ($945 base price for $128K and CP/M 3.0; 5¼" or 8" drives priced separately).

Apple owners interested in moving to an IBM, but held back by the wealth of programs available for the Apple, may want to evaluate the Quadlink board from Quadram Corporation. It is said to provide Apple emulation within the IBM PC or XT, allowing CP/M 3.0 to be run.

• ***CP/M computer owners*** may consider the dual-processor (8088/Z80) IBM clones. There are also several new, powerful CP/M units. The Kaypro 10, with a 10-megabyte hard disk drive should be a runaway at $2,795 list, barring unforeseen problems with its portable Winchester. The 8-bit Eagle series, running from $1,995 list for the Eagle II with two 400K drives and software, to $3,995 for a 10-megabyte hard disk plus a high-capacity floppy, offers excellent value. Also, multi-format emulation software, such as UniForm from Micro Solutions *(see review on page 3)* makes program and data portability a reality.

• ***S-100 machines*** offer second-computer buyers with an alternative to the IBM PC bus and a way to avoid obsolescence. They are not cheap, but they generally offer high quality design and manufacture, standardization (now blessed by the IEEE), and a wide range of products which are generally on the cutting edge of microcomputer technology. You will not go wrong with a Compupro system from Goodbout Electronics (a functional 816/A system with a terminal but no printer starts at about $5,500). However, you should make sure that this type of strictly business production environment machine is really right for your needs.

• ***"Notebook" lap-sized computers,*** such as the Epson HX-20, Radio Shack's Model 100, or the announced, but not yet delivered, NEC 8200, represent an additional second-computer option that has emerged in the last several months. Files created on these machines can be unloaded via modem or serial port to a larger computer for final processing and printing. Of the two models on the market at this time, the Model 100 is the most fully featured. However, at $995 for a 24K RAM unit, it is not cheap. It is expected to be challenged on the basis of price and features by other units, starting near the end of the year.

— Henryk Baran

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complaints submitted also be presented to the company in question to give it a chance to respond. For inquiries or to submit complaints, write to the *Better Computer Corporation, 10301 Holly Hill Place, Potomac, MD 10854.*

○ **Home computer software, 10%-20% off list price,** is featured in published-eight-times-a-year Buyer's Guide for eight product divisions. These include: Atari 400/800; Commodore VIC-20; TI-99/4A; Apple II, II+; TRS-80 Color Computer; Timex/Sinclair; IBM PC; and video game systems (Atari VCS/2600-5200, ColecoVision, Intellivision, Odyssey 2). Charter subscription is $15 per year for first product division, $5 more for an extra division.
The Software Guild, P.O. Box 5022, Clifton, NJ 07015.

○ **The Apple Card,** which permits consumers to finance up to 90% of the cost of an Apple computer, has been announced by Apple Computer and General Electric Credit Corporation. It is the first credit card to be issued by a computer manufacturer. Consumers may apply for it at any participating, authorized U.S. Apple dealer at the time of purchase, but must finance a minimum of $825. In most cases, according to Apple, credit will be authorized as the customer waits. The card may be subsequently used to charge purchases of at least $100 in add-on Apple equipment and compatible software.

○ **Micro Managers band together.** The men and women who guide their corporate employees into personal computing are forming professional groups to address major and sometimes thorny issues, such as training, maintenance, and networking. The close to 100 members of the one-year-old Microcomputer Managers Association, meet in New York. *(Call Alan Gross — (212) 536-7063 — for more information).* In California, another MMA is proposed by a Glendale project manager, James Haner. *(Inquiries to Dynamic Computer Services Co., 38240 N. 6th St. W., Palmdale, CA 93550.)*

When the image is worth (almost) a million words...

Video cassette recorder (VCR) backup for hard disk drives, a technology that hit the market with a dull thud in the late 1970's, is fast gaining acceptance today among personal computer owners. Reason? The steady decline of hard disk prices. (A Kaypro 10 with a 10-megabyte Tandon disk now lists for $2,795; its street price, however, is closer to $2,500.) VCR backup — using a $500 to $800 interface — offers one of the very few approaches to safeguarding disk data that is both convenient and cost-effective.

Nearly all models of mass-market VCRs now found in a large number of homes and offices can be used for disk backup. They have several distinct advantages over their closest rivals: streaming tape drives (a born-again technology dating back to the first-generation mainframes of the 1950s, which also uses a video-type cassette):

- Extensive storage capability. Close to 100 megabytes of data (close to a million words) can be packed into the two-hour cassettes used for backup in Alpha Micro special-purpose mini/micro systems.
- High reliability. Over 90% of maximum theoretical storage capacity (2+ gigabytes [billion bytes] for a 120-minute cassette) is used to assure accuracy of stored data — through multiple recording of blocks of data so that at least one copy is error-free. Hands-on tests by Corvus Systems have shown an unrecoverable error rate of one per 15,000 hours.
- Selective retrieval. Data files can be backed up from, or restored to specific hard disk sections. Streaming tape systems have more limited selectivity capabilities.
- Economy. VCR per megabyte equipment costs range from $6 to $10 for VCRs and up to $45 for streaming tape.

But, using VCR disk backup also has negative aspects:

- Low data transfer speeds. Typical backup and restore rates for the Corvus Mirror VCR interface are 11 minutes for a 5.7 MB disk, 17 minutes for 10.8 MB, and 35 minutes for 19.7 MB. During these periods the hard disk is inaccessible to users. In contrast, the recently-announced Tandon TM951 50 MB streaming tape drive has a data transfer rate of 250 kilobits per second, the same as a 5¼-inch floppy disk drive.
- Limited sources. There are currently only two significant producers of VCR backup systems: Corvus Systems whose Mirror interfaces are now used with Corvus disks as well as personal computers of all major makes, and Alpha Micro Systems. The latter's VCR backup systems are used in nearly 1,000 of its special purpose mini/micro installation. Both systems are basically similar. They consist of a plug-in circuit card which is both a controller and a digital/video interface; software subroutines for implementing backup and restore instructions; and a set of two coaxial cables to carry data in both directions between the VCR and the controller.

According to Corvus, about half of the over 1,500 Winchester drives it ships each month now include Mirror VCR interfaces. Among the personal computers which can use the $790 Mirror to back up their Corvus disks are the Apple II, II+, IIe and III, Atari 800, DEC Rainbow 100, NEC, Osborne, most S-100 computers, including Altos and Cromenco; and TRS-80 Models 1, 2, 3, and 7. According to some dealers, the Mirror can also be used with the Models 12 and 16.

There is also a $495 version of the Mirror for the IBM PC XT. This is the first such product that does not require use of a Corvus disk. No such move is yet planned for the Kaypro 10 which features equivalent disk storage at about half the cost of the XT.

Hard disk prices will continue to decline, and use of VCR backup by personal computer owners will expand. However, much of this expansion may not be just for archival storage. The potential role of video cassettes as media in exchanges of long active data files by mail or other non-electronic means, is fast gaining recognition. In the not too distant future, as plans for downloading of computer software and data via television networks are realized (see September, 1983 issue of *BMR*) video cassettes will play a new role: as media for unattended nighttime information transmission or receipt. ●

Hands On...

UniForm, Version 1.0. *Micro Solutions, Software Products Division, 125 S. Fourth St, DeKalb, IL 60115. (815) 756-3421. $49.95.* With the proliferation of microcomputers, the problem of diskette incompatibility between different machines has been gaining urgency. An attempt to alleviate this problem is a package called UniForm, from the creators of the Kaypro utility. It includes two simple menu-driven programs, SETDISK and INITDISK. The SETDISK allows drive B to emulate one of 15 popular CP/M formats (Osborne single and double-density, Kaypro II, Xerox 820, IBM CP/M-86, Texas Instruments Professional, Health/Zenith, etc.). The user places a diskette of the format emulated in drive B and can work on his files. INITDISK is used to initialize diskettes in the format of any of the above computers.

For this review, UniForm was run on two Kaypro II machines, and tested on Osborne and Access Matrix formats. The program created and verified fully usable diskettes, as promised. Since UniForm does not place a copy of the CP/M system on diskettes, they could not be used by themselves for booting the system, but rather as data diskettes for an application program (a copy of the appropriate CP/M system could be already SYSGENned on the proper machine).

SETDISK allowed easy operation on data files. An Osborne diskette with WordStar files was used in conjunction with a WordStar application diskette in Kaypro format. Existing files were edited and several new ones were created. Subsequently, after the data diskette was placed again in the Osborne, the Osborne WordStar allowed normal handling of the material.

Standard CP/M operations were performed successfully from format to format. Files were PIPed to and from Kaypro-Osborne and Kaypro-Access Matrix formats. Problems with writing to disk during PIP were encountered twice: in each case, only the reverse side of a double-sided double-density diskette was involved. Drive B remained in the same format

(continued on page 5)

INSIDER NOTES...

by Bill Norris

This month's column contains an important addition to the library of subroutines we began last month. It's a program which will enable you to effectively use the FILES command of MBASIC (Microsoft BASIC). Also featured are enhancements of the two subroutines for conversion of strings to upper and lower case introduced in last month's column. In addition, we will cover a method for easy indexing of the subroutine library as well as some tips on how to maintain the library in a minimum of disk space.

Using the FILES Command

Articles in various publications have, at times, claimed that the FILES command in MBASIC is ineffective. Actually, the problem does not relate to the FILES command, but to the misinterpretation of the asterisk (the wild-card pattern matcher) in the command, due to its faulty placement in the program. The program listing on this page demonstrates the solution of this problem. (Warning: make sure that the disk in drive B is clear of data before using the program.)

Upper/Lower Case Conversion

By using the enhanced subroutines shown on this page, you can eliminate the following program steps: copying each string of characters to S$; calling a conversion subroutine; copying the modified S$ contents back into the string. Now that your program states S=VARPTR (YOUR STRING$): GOSUB 50060, YOUR. STRING$ will be converted to UPPER- or LOWER-case directly.

These enhanced subroutines are faster than their original versions and do not waste string space. This is particularly desirable since it helps eliminate the abrupt program halts (up to several minutes' duration) which occur when all string space is filled. This halt is caused by an MBASIC recovery operation known as "garbage collection". Its duration varies with the length and complexity of the program.

Indexing the Subroutine Library

The upper/lower case conversion subroutines in this column take up one more line than their original versions on line 50190 through 50240. If you want the enhanced versions to occupy the same relative position in the library index as the originals, you should do the following:

1) Load the old library, delete the functions to be changed, and save a temporary copy.

```
OK
LOAD "LIBRARY"
OK
DELETE 50190-50240
OK
SAVE "TEMPLIB",A
OK
```

2) Enter the new lines, and change line numbers so that the new subroutines fit into the space left open for them. Add them to the library, and adjust the index to allow for their greater length.

```
OK
AUTO 50190
50190...enter
        lines...
^C
OK
RENUM 50190,,5
OK
MERGE "TEMPLIB"
OK
EDIT 50070
```

...change the GOTO 50220 to GOTO 50205. Line 50060 (the index to the UPPER-case subroutine) does not need to be fixed...

3) Skip this step if you do not want to change the line number in the bottom

FILES Command Program

```
1000 ON ERROR GOTO 1020: PRINT "Clearing B:"
1010 KILL "B:????????.???": GOTO 1010
1020 RESUME 1030
1030 ON ERROR GOTO 0
1040 PRINT "Creating files on B:"
1050 FOR I=1 TO 4:
       OPEN "O", #1,"B:TEST-YES"+CHR$(48+I):
       CLOSE: NEXT I
1060 FOR I=1 TO 4:
       OPEN "O", #1,"B:TEST-NO"+CHR$(48+I):
       CLOSE: NEXT I
1070 FOR I=5 TO 8:
       OPEN "O",#1,"B:TEST-YES"+CHR$(48+I):
       CLOSE: NEXT I
1080 FILES "B:*.*":
       REM This displays everything, but...
1081 REM To display only the TEST-YES files you
1082 REM can't use the form FILES "B:TEST-Y*.*"
1083 REM because MBASIC treats the asterisk
1084 REM as a wild-card character only if it is
1085 REM the first character in either the file-
1086 REM name or filename extension. The next
1087 REM line shows how to accomplish this.
1088 FILES "B:TEST-Y??.*":
       REM or be safe and use 'FILES "B:TEST-Y??.?" '.
1090 PRINT: PRINT "B: files selectively erased"
1100 ON ERROR GOTO 1120
1110 KILL "B:TEST-NO.???": GOTO 1110

1120 RESUME 1130
1130 ON ERROR GOTO 0
1140 FILES "B:*.*"
```

Upper/Lower Case Conversion

```
50190 '* Convert string (<=S) to UPPER-case.
50200 GOSUB 50250: FOR J%SS%; TO SS%+PEEK(S):
       JJ%=PEEK(J%):
       IF JJ%>96 AND JJ%<123 THEN POKE J%,JJ%-32
50210 NEXT J%: RETURN

50220 '* Convert string (<=S) to lower-case.
50230 GOSUB 50250: FOR J%=SS% TO SS%+PEEK(S):
       JJ%=PEEK(J%):
       IF JJ%>64 AND JJ%<91 THEN POKE J%,JJ%+32
50240 NEXT J%: RETURN
50250 SS=PEEK(S+1)+256*PEEK(S+2):
       IF SS>&H7FF THEN SS%=SS - 65536!:
       RETURN ELSE SS%=SS: RETURN
```

Bill Norris is a professional systems analyst and program developer. He is a frequent contributor to the newsletter of the New York Amateur Computer Club.

half of the library.

```
OK
RENUM 50000
OK
```

4) Save the library. Note that the name "LIBRARY" is not used at this point. This allows you to test the new version and still retain the original as backup. After you make sure that the new library is satisfactory, it may be saved under "LIBRARY." (Actually, the name on the disk is "LIBRARY.BAS").

```
OK
SAVE "TEMPLIB",A
OK
```

One of the advantages of having an indexed library of this type is that subroutines can be rapidly and easily located. For instance, you could not use UPPER-case subroutine if you did not recall its location. Since you could not incorporate the subroutine's line number into a GOSUB statement, you could not access it. Without an index, you would have to type LIST and search for the subroutine. If you did not find it, you would have to LIST the program again.

With an index, you can simply type LIST 5000- to quickly spot the line that points to the UPPER-case subroutine. In this case, you would then see the lines — 50060 GOTO 50190 ' Upper case conversion and 50070 GOTO 50220 ' Lower case conversion. At this point, you could put the statement GOSUB 50060 into your program. All that you would have to do to examine the subroutine would be to type LIST 50190-50220.

Saving Disk Space

Saving MBASIC programs and their updates and enhancements frequently results in copies of the same programs being stored on a disk. You can easily recover the space occupied by these libraries, simply by deleting all subroutines except the latest LIBRARY.BAS version on the disk (or disks). The next time the application is loaded, merge the library with the program. (Note: make sure that you save the library with the "A" option.)

Still on the subject of disks: MBASIC allows files to be saved in a "protected" format. What do you do if the master disk containing the only "unprotected" copy of the program is damaged? And, what if you inadvertently save a protected copy on the wrong disk? Can the program be recovered, and how? Next month's column will show you how to accomplish that. ●

until SETDISK was used again to change it, or until a cold start of the machine became necessary. Warm booting did not affect it.

Data files and source code can be transferred without any problem with the UniForm package. Object code can also be transferred, but there is no guarantee that a program which runs on one machine will work without modification on another. It is thus not enough to move over dBase II or WordStar from one computer to the next. They would have to be reinstalled to make them compatible with the new computer.

Micro Solutions initially released UniForm on Kaypro II format diskettes. It is now also available for the Osborne and the Access Matrix. Given the enormous increase in file portability which the program makes possible, its $49.95 price is more than reasonable. The documentation is brief but good. Upgrades will be $17 prepaid, $18.50 postpaid.

Micro Solutions is planning to release expanded versions of UniForm for the Kaypro IV and Kaypro 10, which may handle around 35 disk formats. Both single-sided and double-sided MS-DOS may be included, with file transfer between the two operating systems made possible by an accompanying utility. *— Henryk Baran*

More about VDT's. While the controversy over possible health hazards caused by VDTs continues to linger (see September issue of *BMR*, page 5), yet another study on the effects of video display terminals reaches some interesting conclusions. A one-year research study by Wright Line, a manufacturer of computer support furniture and filing systems, conducted in the company's own data and word processing departments, found that the evidence of eye strain appears to increase for some viewers. These include VDT users who are near-or-far-sighted but who do not wear corrective glasses and individuals with light iris pigmentation.

The study report recommends early opthalmologic examinations for employees who spend more than 50% of their workday at VDTs. Gray-tinted lenses are recommended to ease the strain caused by fluorescent lighting in most work areas. ●

Renting...FOR CONVENIENCE

Do you need a computer right now to meet a deadline, while your own system is being repaired? Or, perhaps, you want to evaluate that second computer before you make that investment? Then, renting could be for you.

Note, however, that renting a personal computer is not cheap. Typically, six to eight months rental payments equal a machine's purchase price. However, what you are paying for is the convenience.

A major source of machines for monthly rental is General Electric. Its outlets in seven major U.S. cities offer IBM PCs, Apple II, IIe and III, and DEC Rainbow 100 computers among others. Base monthly rental for a 64K IBM PC is $250. More advanced packages with printers and software may top $600 per month. GE also rents complete IBM, Apple, or Hewlett-Packard system packages — e.g., IBM PC with two disk drives, printer and software for $625 a month. Software rentals run from $20 to $70 a month. GE also has a three-month offer which lets you use a different computer each month. Minimum rentals, typically, run a month. However, a computer can be rented for less than a month's time, but beware, the price on that basis gets much stiffer. The charge for renting for seven days or less, for example, is 50% of a full month's rental.

If you're looking for a shorter-term rental, there are local dealers who rent micros on a daily, weekly and monthly basis in most cities and towns across the country. Some even advertise to out-of-towners in hotel literature. Their rental units are often trade-in machines.

Typical rates are those of Anchor Computing Systems, Seattle, Washington: Otrana Attache ($2,995 retail), $30 daily, $150 weekly, $410 monthly; Zenith Z1000 ($3,400 retail), $40 daily, $180 weekly, $470 monthly; Kaypro II ($1,595 retail), $20 daily, $90 weekly, $250 monthly and $690 for three months. Rental fees are credited toward purchase and include software.

To find companies which rent, look in the yellow pages under "Renting Services" and "Computer Dealers." ●

TOOLS AND CONCEPTS

• **Microtek bundles software and slotware.** The trend to sell computers with applications software is spreading to peripherals. Among the first-on-the-market peripheral hardware/software packages is one recently announced by Microtek, Inc. It consists of the TOTL.TEXT 2.5 or 2.6 word processing program from TOTL Software combined with a CC-2064 interface cable for parallel printers for the Commodore-64 or VIC-20. The package lists for $99.50. The cable interfaces were previously sold separately for $69.50. Program retails for about $40.

Also bundled are Microtek's BAM 128K memory expansion card and Q Disk card, which are sold with VisiCalc expansion software to permit running of VisiCalc with an additional 128K bytes of memory. The prices of the Q Disk and RAM packages are $449 and $479 respectively.

Microtek plans to bundle its Q Disk cards with Pascal CP/M pre-boots, starting in the late fall. These are now being sold separately for $29.95. Winn Schwartau, vice president of marketing, told *BMR* that the Q Disk would be further enhanced this year with the addition of either a free spreadsheet or a word processing program.

• **The Smith Corona TP-II letter quality printer** is an enhanced version of the widely used TP-I daisy wheel printer. Its improvements over the TP-I include availability of both RS232 serial and Centronics parallel interface ports; easier setting of operating characteristics; and an ASCII 10/12 pitch printwheel to print out program listings. The list price of the TP-II is $895. A tractor feed attachment costs $149.

• **Typewriter-to-computer printer conversion modules** are available for Olivetti and Smith-Corona portable electronic typewriters.

• Type & Print module ($179) adapts Olivetti Praxis 30, 35 and 40 for computer connection. The unit, which is being adapted for other low-cost typewriters, features a standard parallel interface. *Applied Creative Technology, Inc., 2723 Avenue E East, Suite 717, Arlington, TX 76011. (800) 433-5373.*

• Smith Corona Messenger Module ($170) can be plugged into the Smith Corona Memory Correct III typewriter ($599 list) to convert it into a printer. The unit features both RS 322 serial and Centronics parallel outlets.

• **Kaypro networking system** permits practical linkage of 15 to 20 Kaypro II, 4 or 10 computers into baseband networks operating at just over 125 kilobaud (thousand bits per second) data transmission speeds. The principal components of the Web networking system are a Web transceiver and network interface installed in Kaypro computers, and OPSnet networking software which supports nearly all conventional CP/M 2.2 programs without modification. Computers in a Web network are connected by standard telco telephone cables. There is no dedicated network file or printer server. Every computer acts as both server and local processor. The full cost of the networking option on a Kaypro computer is $195. System may be configured using any combination of Kaypro models.

• **A computer designed for second-time buyers** has been announced by Memotech Corporation.

The MTX-512 (previewed in the August issue of *BMR* as the MTX-500) provides users with expansion capability to meet their developing needs. It comes with 64K bytes of user-accessible RAM, expandable to 512K and up to 80 megabytes of floppy and hard disk storage. Its Z80A processor can be upgraded from 4 MHz to 6 MHz. Apple and IBM-compatible disk cards are available as additional expandability options. As many as eight MTX-512s can be networked together, via the Oxford Ring system.

By the time you read this, the $595 computer should be in retail stores accompanied by a full range of peripherals. Their prices have not been released, but the full system, exclusive of a printer, is targeted at about $1500. An Epson-quality dot matrix printer will also be available.

The extended Oxford Basic programming language, with Logo commands, is built into MTX-512 ROM. The Noddy educational language, Pascal and Forth are available as add-on packs. There are eight virtual screens which enable programmers to define which sections of the screen will work independently, while maintaining full screen facilities. A full range of CP/M applications software and game cartridges will also be available.

The MTX-512 warranty period is six months, twice as long as the industry average. An 18-month "Extended Warranty" for parts and labor will also be available. For inquiries: *Memotech Corporation, 7550 W. Yale, Denver, CO 80227.*

PRODUCT PREVIEWS

• **KAYPRO** — If you're looking for a 16-bit transportable computer with a 10-megabyte hard disk and IBM XT compatibility, but you're not in too much of a hurry, Kaypro may have a deal for you. According to the company's prospectus (at this writing, Kaypro is about to go public), it is developing just such a product. Kaypro is also continuing the expansion of its networking and telecommunications capabilities.

Incidentally, the announcement of the 10-MB hard disk Kaypro 10 (available for about $2,600) cast a shadow over another new product, the Osborne Executive, whose 128K-bytes RAM and promised IBM compatibility for close to $2,500 have left some Osborne user group members less than thrilled.

• **SPECTRAVIDEO EXECUMATE** may be the first portable computer to challenge the TRS-80 Model 100 and the still undelivered NEC 8200. Reportedly, it will come out in the spring of 1984 and will be competitively priced (something which is almost guaranteed by SpectraVideo's aggressive past performance). It is certainly competitive on the basis of preliminary specifications: 64K ROM; 32K RAM, expandable to 64K (vs. 32K for the Model 100); and a 16 line by 40 character display (twice as many lines as the other two units). Built-in hardware includes a modem; microcassette recorder; cassette and bar code reader interfaces; and an RS232 port. Reportedly, an adapter will permit the ExecuMate to use peripherals for SpectraVideo's SV-318 computer.

Built-in ExecuMate software includes word processor, Multiplan spreadsheet, terminal, appointment schedule, and address book (mailing list) programs. The ExecuMate will also come with Microsoft Basic. Presumably, it will run some or all SpectraVideo's extensive CP/M program library.

REPAIRS (Cont'd.)

Even though he has not needed major repairs, Ryerson feels that the contract has paid off for him. "Sure, I could have saved myself some money if I hadn't done it, but I don't like to press my luck," he says. "I feel much better knowing that I can take in a piece of equipment and be sure that somebody will look at it and give it priority."

Service is fast, according to Ryerson. "Especially," he says, "since I took out the dealer's service contract." Even though he paid $300, while the Osborne extended contract would have cost him $285, there was one more important difference. "If the dealer could not fix the problem in 24 hours, he was committed to give me a loaner," says Ryerson, a college instructor. "While not all dealers make that explicit in writing, one should, at the very least, discuss a loaner with the dealer, before signing the papers."

For those who like to deal with their problems as they come up, there is a growing number of nationwide repair and maintenance service organizations as well as dealers who offer service on a non-contract basis.

At TRW, a third-party computer and service company with facilities in some 200 locations, Gene Carson, Manager of the Dallas Computer Service Center, says: "You get a 90-day warranty on anything we fix."

TRW offers both carry-in and on-site service. The former costs $60 an hour, the latter is $86 plus transportation charges. A preventive maintenance checkup, including cleaning disk drive heads, checking machine cycles, time and cables and connectors, is $60.

The least expensive service at TRW is cleaning an Apple disk drive; the cost is $50. The most costly, says Carson, is a problem with the IBM PC main logic board. It could set you back some $250.

TRW services game machines through swapping non-working parts for those kept in stock. Replacing Mattel Intellivision hand controllers costs $30 for one unit, $45 for both. Service here is immediate or, at the least, within 24 hours, Carson says.

At Sorbus, which has 160 service centers around the country and is the designated service organization for a wide range of computers and peripherals, hourly service costs $50 plus parts, for carry-in repairs.

There are also flat fees for diagnostics and tests. Typical charges, says Richard Leonowitz, Sorbus' Director of Marketing, "run you $40 for terminals; $75 for letter-quality printers." Generally, the most expensive to repair are main logic boards. "Costs can run you close to $300," he says.

What happens if you don't have a maintenance agreement and have toted a seriously-troubled under-$1,000 personal computer to your friendly service center? According to Leonowitz: "Ask the man in charge for an estimate up front — a guarantee that your repair rates are not going to be higher than what you paid for the computer."

At ComputerLand, the nation's largest dealer, in-store repair service costs generally run between $35 and $65 an hour, exclusive of parts (and may vary from store to store). Phil South, Technical Services Manager at the Buffalo, New York store says: "Because of the devastating expenses that could incur, we encourage our customers to take out extended service contracts after the expiration of their 90-day warranty."

But, what of the owners who never have any problems? (Like Harry Geist of Nyack, New York who has had his Apple II for 3 years, without a contract, and says, "never had anything fixed yet, knock wood.")

"They may be just lucky," says ComputerLand's South. Like the man said, it's a crapshoot. ●

FYI

- **Don't assume** that your 90-day warranty automatically assures you of three worry-free months. Some users have discovered to their chagrin, that their warranty had started the day the hardware left the factory. Check out all the paperwork that comes with the machine, especially if you've bought it at a discount house or through mail order.
- **An advantage of the extended service contract** with the manufacturer is that it will be installed by trained technicians. But what the contract does not cover are peripherals from another vendor. So, if you get a display from one manufacturer and a disk drive from another, you may be better off with a contract from the dealer who services all equipment sold by the store, including foreign peripherals.
- **Always call your dealer first** when your system breaks down. If the dealer can't help you, he can often call the manufacturer for technical help.
- **A rule-of-thumb on repair charges:** you should not be paying more than 1 to 1½ percent a month of the cost of your machine. If you're being charged more than that, you may have just cause to feel you're being ripped off.
- **Preventive maintenance:** Generally, all mechanical parts should be serviced at least once a year, whether the system develops problems or not. Heavily-used hardware should be serviced every six months.

SOFTWARE...

- **TaxCalc** is a tax-planning computer program designed by CPA Harry S. Chud to support computation of income tax "variables" and the selection of lowest tax alternatives. The system uses VisiCalc, SuperCalc, 1-2-3 or Multiplan templates and is compatible with most personal computers. The TaxCalc programs cost $125. The California tax planning template is $100. Updated templates for 1984 will be $50. To order: *TaxCalc, 4210 W. Vickery, Fort Worth, TX 76107. (817) 738-3122.*

- **RXWRITER** is designed for faster writing of more accurate and legible prescriptions by physicians. Tested for over five years in a busy medical practice, RXWRITER creates a disk file containing patient's name, date, diagnosis and prescription abbreviations (up to six entered at one time). A HELP routine permits rapid lookup of information on drugs in the physician's drug file. It is available on both standard single density 8-inch disks and on 5¼-inch disks formatted for most popular 8-bit CP/M systems, including the Apple II with CP/M card, and the IBM PC with Baby Blue board. $50, including 36-page indexed manual, available separately for $8.00. *Hall Design, 250 Maple St., Wilmette, IL 60091.*

- **RTD** is a communications program which gives the Kaypro II personal computer automatic access to on-line database services such as Dow-Jones, The Source and CompuServe. RTD operates at 300/1200 baud rates and is compatible with most non-autodial modems. The program includes configuration menus for five user-defined services; dispatching and capturing files; a 16K-byte buffer for temporary

(continued on page 8)

WORDS PROCESSED...

Troubleshooting & Repairing Personal Computers. *By Art Margolis. 311 + vii pages. Tab Books, Inc. $13.95.* Although geared to the television serviceman, this book explains the inner workings of the microcomputer to anyone who has a basic understanding of analog circuits. Chapters are devoted to describing the functions of individual digital chips as well as the operation of the entire system. Coverage includes individual logic gates, digital registers, memory chips (RAM & ROM), large scale integration (LSI) and the CPU itself. System operation is described as well, with emphasis given to hardware rather than software.

Specific examples in this profusely illustrated book are based exclusively on the Radio Shack Color Computer. This creates a drawback in one important respect; the joystick description is based on the less popular analog type used by Radio Shack, instead of the digital (Atari) type used by most machines. Some discussion of the digital type would have been desirable in view of the physical vulnerability of this component. Nevertheless, the considerable detail on the general workings of the microcomputer make the book of value to anyone interested in obtaining a better understanding of their machine.

—Morton A. Kevelson

• **Catching Up With the Computer Revolution.** *531 pages. Wiley. $22.95.* The latest volume in the Harvard Business Review Executive Book series, includes some 29 articles dealing with a wide range of subjects, from "Embezzler's Guide to the Computer" to "Doing Your Office Over — Electronically." Topics include applications for the new technologies, information resources, computer fraud and database management.

• **Managing Microcomputer Security.** *Computer Protection Systems, Inc., Suite 4, 711 Ann Arbor Trail, Plymouth, Mich. 48170. $15.* This report deals with a variety of microcomputer security issues. Includes sections on site, hardware, software, data base security. Also covered: copyright laws, software protection, disaster preparedness and preventive maintenance.

• **Z80 Assembly Language Subroutines.** *By Lance A. Leventhal and Winthrop Saville. 550 pages. Osborne/McGraw-Hill. $15.95.* All about assembly language programming for the Z80 microprocessors. Includes a collection of some 40 routines which can run on Altos, Cromemco, Eagle, Kaycomp, North Star, Osborne, Tandy/Radio Shack, Zenith/Heathkit and on other Z80 based microcomputers.

Code is provided for popular routines including array manipulation, arithmetic, bit manipulation, code conversion, summation, sorting and searching. Also covered are examples of I/O routines, interrupt service routines and initialization routines for common family chips, such as parallel and serial interfaces, as well as timers.

• **Create Word Puzzles With Your Microcomputer.** *By Ernest E. Mau. 304 pages. Hayden Book Company, Inc. $14.95.* This book contains some 17 Microsoft Basic programs, 25 acrostics, cryptograms, word-finds, quote-falls, fall-ins and other word puzzles. The programs are designed to handle large alphabetic data bases which are formed from word and quotation files created by the user. The puzzles are constructed from the data bases. Each program has an accompanying illustration and operational instructions.

• **Tax Breaks for Computer Buyers.** *By Vernon Jacobs, CPA, 26 pages, Research Press. $9.* This report on tax deductions and rules for computer buyers outlines information such as deductions for computer purchases for full and part-time business use, investment management and computer program development. For information, call: *(913) 362-9667, Prairie Village, Kansas.*

SOFTWARE (Cont'd.)

data storage, and one-time installation for various database services. Its price is $85. *Acquis Data, Inc., 17192 Gillette, Irvine, CA 92714.*

• **Keychanger** enables you to program your keyboard function keys to simplify command input and provide instant access to different sets of functions. The program, which can be run on most CP/M computers, includes ready-made functions for WordStar, dBase II and BASIC. Users may also program their function keys to create their own custom functions. They are guided step-by-step in this process by on-screen menus. Program diskettes come with preprinted, label strips that indicate the functions of individual keys. Keychanger is priced at $29.95 for an introductory period, and will sell at $49.95 thereafter. *Computer Publishing Company, 1945 North Fine, #101, Fresno, CA 93727. (209) 453-0777.*

• **Money Manager** is a personal finance system which helps individuals track expenditures, balance their checkbooks, and prepare financial summaries, graphs, reports and tax forms — by categories and for specified periods. Written in CB80, Money Manager includes a configuration program which allows the user to customize the software to the computer used (most micros with at least 56K bytes of memory, using CP/M, CP/M-86, and compatible operating systems) as well as to set up check formats for the system's Automatic Check Writer module. Its price is $125. *Woolf Software Systems, 23842 Archwood St., Canoga Park, CA 91307.*

• **COMPASS** is an interactive software-based package for training of business support personnel (administrative assistants, executive secretaries, junior professionals). COMPASS offers three 30-minute simulations of business situations to provide decision-making experience, focusing on developing skills in problem-solving, interpersonal skills and time management. Workbooks containing introductory material accompany the diskettes. A half-day workshop session concludes the training program, providing participants with an opportunity to review course feedback and to examine the logic for each decision.

COMPASS software runs on an Apple II. IBM PC and Wang versions will be available in the near future. For information, contact *Choices, 316 Fifth Ave., New York, NY 10001. (212) 687-6390.*

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PERSONALIZED REPORT FOR: TRS-80

October, 1983 Edited by Joel Sampson

* NEW TRS-80 PRODUCTS

Radio Shack has introduced many interesting and useful new products so far this year. Among them is the new TRS-80 Color Computer, which should be in the stores now. The old CoCo was one of the best buys in the lower-priced "home" computer marketplace though it did not have the mass appeal of the $88 Commodore VIC-20 or the $89 Texas Instruments TI 99/4A. The new CoCo still features the Motorola 6809 MPU, probably the most powerful 8-bit microprocessor made. Visual changes include a new "real" typewriter keyboard and the TRS-80 off-white color scheme.

Radio Shack is also offering a 64K extended Basic computer for $399.95. The 64K memory had not been supported by Radio Shack until now; this was left to third-party hardware and software developers. The addition of the 64K computer to the Radio Shack product line means added convenience to users.

Currently, the standard TRS-80 Basic computer lists for $239.95. A 16K machine with extended Basic lists for $319.95. These computers have the new keyboard and the TDP-100 white enclosure, which features vents across the top of the rear cover.

The outstanding new TRS-80 product introduction so far this year is the OS-9 DOS (see announcement in Software section). The new disk operating system is available at Radio Shack outlets for $69.95. Requiring at least one disk drive, OS-9 is a Unix-like disk operating system that uses a system of "shells" (programs that interpret keyboard commands). It supports multi-tasking and comes with an Editor/Assembler. It even may be possible to have an OS-9-based multi-user system should more memory become available for the Color Computer.

Actually, the recently released multi-pack interface provides the potential for plugging more than 64K-bytes of RAM into the CoCo. The new $17.95 interface allows up to four ROM packs to be used at once. This enables users to run both a disk drive and a graphics tablet at the same time. It also opens up many possibilities (look for a real-time clock and other plug-in devices). CoCo with OS-9 could become an under-$1,000 system that is superior to many other computers (including the IBM 16-bit machine), particularly in terms of performance-per-dollar.

* DOING IT BETTER

o COCO TIPS

. Want to make a hard-copy listing of your disk directory? The easiest way is to type:

```
POKE 111, 254:DIR
```

. Which Basic ROM does your Color Computer have? If you have extended Basic, the computer boots up with just the extended Basic release. To see which standard Basic you have, you can type:

```
EXEC 41175
```


(Continued on page 10)

o CENTER PRINT UTILITY PROGRAM

The program that follows is a utility that will help you format the screen output using PRINT@ (PRINTTAB if you run CP/M). It will give you the location to center text on the screen of any TRS-80 computer. To use the program, enter the model number of the TRS-80 system you are using and the string to center at the prompts. The program will display the location to print at and will then go back for another string. To end the run, type END or terminate at the string prompt.

This program was written on a Lobo MAX-80 under LDOS and should run on any TRS-80 computer without modification.

```
2Ø ' "TRSPRINT/BAS" TRS-8Ø Center Print Utility
4Ø ' Copyright 1983 by Joel Sampson, All Rights Reserved
6Ø CLEAR 1ØØ
8Ø CLS
1ØØ PRINT "This program centers a line of text on the CRT screen.
12Ø PRINT "Do you want to pretty print on a (M)odel I/III, (C)olo
14Ø PRINT "Computer or a (8Ø)-column CP/M system?"
16Ø PRINT:INPUT "Enter your choice (M, C or 8Ø)";C$
18Ø IF C$ = "m" OR C$ = "M" THEN C = 1 ELSE IF C$ = "c" OR C$ = "
 ---":GOTO 12Ø
2ØØ PRINT:PRINT"Type END at the string prompt to quit."
22Ø PRINT
24Ø INPUT "Enter the string you wish to center";S$
26Ø IF S$ = "END" OR S$= "end"THEN END
28Ø L = LEN(S$) ' find length of the string
3ØØ ON C GOSUB 38Ø,52Ø,68Ø
32Ø GOTO 22Ø
34Ø '
36Ø ' Model I/III Subroutine
38Ø INPUT "Which line do you want it on (1-16)";LN
4ØØ IF LN < 1 or LN > 16 THEN PRINTTAB(2Ø);"Error ---":GOTO 38Ø
42Ø P = INT((64 - L)/2) + (LN * 64 - 64)
44Ø PRINT "PRINT@";P;",";CHR$(34);S$;CHR$(34)
46Ø RETURN
48Ø '
5ØØ ' Color Computer Subroutine
52Ø INPUT "Which line do you want it on (1-16)"; LN
54Ø IF LN < 1 or LN > 16 THEN PRINTTAB (2Ø);"Error---":GOTO 52Ø
56Ø P = INT((32 - L)/2) + (LN * 32 - 32)
58Ø PRINT
6ØØ PRINT "PRINT@";P;",";CHR$(34);S$;CHR$(34)
62Ø RETURN
64Ø '
66Ø ' 8Ø-character CP/M Subroutine
68Ø P = INT ((8Ø - L)/2)
7ØØ PRINT
72Ø PRINT "PRINTTAB(";P;");";CHR$(34);S$;CHR$(34)
74Ø RETURN
```

THEN C = 2 ELSE IF C$ = "80" THEN C = 3 ELSE PRINTTAB (20);"Error

* HARDWARE

o THERMAL PRINTER FOR THE MC-10 COMPUTER

Radio Shack recommends its new TP-10 thermal printer for use with the MC-10 computer. The printer can also be used with the TRS-80 Color Computer. The 3.3-pound TP-10 prints 32 characters per line at 30 characters per second on 4-1/8 inch wide thermal paper. It can print 95 ASCII characters plus 16 MC-10-compatible block graphics characters. The TP-10 thermal printer lists for $99.95. A package of two rolls of thermal paper costs $3.95.

* HARDWARE REVIEW

o MC-10 COMPUTER

Radio Shack's new small Color Computer, the MC-10, uses a 6803 microprocessor and comes with a basic 4K RAM memory. Its price is $119.00. An additional 16K bytes of RAM cost $49.95. The MC-10 has small chiclet keys and a single shift key which makes data entry very difficult, but it does have several single key commands and statements. These features and limitations are similar to those for the ubiquitous Timex Sinclair 1000.

The MC-10 has a RS-232 port using the 4-pin DIN, as does the full-size CoCo. This is a convenient feature as users can connect standard printers or even a modem when software becomes available. There are no joystick ports or ROM-pack ports.

The MC-10 video output is similar to that of the CoCo, but high-resolution graphics are not supported. While the MC-10 may be suitable as a machine on which beginners can acquire computer literacy, the Color Computer without extended Basic represents a much better buy.

* SOFTWARE REVIEWS

o PROOFREADER

Proofreader (by Aspen Software Co., $50.00) is a spelling checker which runs on TRS-80 Models I, III, IV and on CP/M-compatible computers. Tested for this review was the CP/M version which runs on Models II, IV, 12 and 16 in the TRS-80 product line. The reference used is the Random House Dictionary, available in either 32K, 50K or 80K-word versions. (The desired version must be specified by the user, depending on the capacity of his disk drives.)

To check the spelling of words in a text, type PRF filename. Proofreader sorts the words in the text and displays the number of words and the number of unique words. It then checks the unique words against the dictionary. This takes about two minutes for the 80,000-word dictionary.

Once possible spelling errors are found, you have the option of correcting the word(s); consulting the dictionary on how each word might be spelled; adding the individual word(s) to an auxiliary dictionary; accepting the word(s) for the remainder of the text; or ignoring the word(s), aborting and ending the program run. If you correct a word, Proofreader checks the spelling against the dictionary. It prompts you if you cannot find the correction, and finally writes it into the text.

Proofreader is easy to use and does a good job. (This reviewer used it with WordStar, probably the most widely used CP/M word processor today.) It comes with a well-written 19-page manual and you can use the program after just a brief perusal. In conclusion, Proofreader is a good value and I recommend it.

o ZAXXON

Zaxxon (by Data Soft, Inc., $39.95), one of the most popular arcade games, is now available for the Color Computer. Its $39.95 price is higher than that of most games, but Zaxxon is worth it. This is a must-have game even if you do not like games, because its three-dimensional graphics are some of the finest this reviewer has seen.

Under the rule of the game, you must guide your spaceship through the gauntlet of an elaborate enemy fortress, shooting at interceptor planes, gun emplacements and radar dishes so as to destroy them as you hurtle by. If you get through, you then have to shoot down enemy ships in outer space. Then, if you survive, you must enter another, yet more powerful fortress.

Zaxxon is for one or two players who use joysticks to guide their spaceship(s). It is not an easy game, but it is very enjoyable.

(Continued on page 12)

* NEW GAMES AND SOFTWARE

o NEW PROGRAMMING LANGUAGES

Radio Shack has introduced two programming languages for the new TRS-80 Extended Color Computer: the OS-9 Disk Operating System ($69.95) accesses the entire computer memory; BASIC-09 is an enhanced version of standard BASIC written for the 6809 microprocessor.

. OS-9 DOS system programs can be grouped into four functional areas: system executive for overall management; shell programs that interpret commands from the keyboard; file managers which perform I/O functions; and device driver programs which adapt OS-9 to the Color Computer's I/O interfaces.

OS-9's editor/assembler allows development of assembly language applications. The diskette contains three programs: text editor, assembler and debugger.

. BASIC-09 includes PASCAL-derived features for structured programming. Its interactive compiler is designed for production of compact object programs for high-speed execution.

o TWO GAMES FOR THE COLOR COMPUTER

Two new games, priced at $19.95 each, are available for TRS-80 Color Computer with at least 16K memory.

. Reactoid takes the player to the world's first nuclear fusion reactor, where the automatic system has failed to operate. The core of the reactor is surrounded by particle-emission tubes. The tubes release energy particles which produce power when they strike the energy posts in the center of the core. Using a joystick to guide the reflectoids, a system-driven device, the player is challenged to guide uncontrolled energy particles to the energy posts, gaining points, and to light up all the posts to get to the next round.

If the player fails to prevent particles from hitting particle-emission tubes, the letters of the world MELTDOWN light up one by one on the screen as the tubes are hit. When the seventh tube is hit, the screen disintegrates in a meltdown, ending the game.

. Gomoku/Renju invites the player to match wits with the computer or another person - with a choice of eight different levels of play. The computer can also play against itself.

In Gomoku, the game is won by the first player to create a horizontal, vertical or diagonal line of five adjacent pieces of his own color. The Gomoku program allows a range of board sizes from 9 by 9 to 15 by 15.

Renju is similar but more complex than Gomoku. It is played on a 15 by 15 board. Restrictions in opening moves are placed on Blue, the player that moves first and must play the central position. During play, there are three types of moves that Blue is never allowed to make, adding to the challenge for advanced players.

* BOOKS

o INVESTMENT ANALYSIS WITH YOUR MICROCOMPUTER by Leslie E. Sparks. 256 pages. Tab Books. Hardcover, $19.95; Paperback, $12.95.

This book is intended to show how to use a personal computer for analyzing all kinds of financial data - from capital gains to risk and return relationships, from profit analysis to variable loan calculations. The fundamentals of designing computer programs that nail down needed investment calculations are covered, accompanied by short illustrative programs and modules.

The main thrust of the book consists of three full-length investment programs for handling individual personal investment analysis applications. Each is written in Microsoft Basic for the TRS-80 Model I or III. All data needed to adapt this software for use on other computers is included.

Additional software modules which can be combined with these programs are also included, along with suggestions and examples of other uses for these programs ranging from common stock investment to quantitative/qualitative forecasting.